इंटरनेट मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

"जानने का अधिकार, जीने का अधिकार"
Mazdoor Kisan Shakti Sangathan
"The Right to Information, The Right to Live"

"पुराने को छोड नये के तरफ"
Jawaharlal Nehru
"Step Out From the Old to the New"

IS 13646 (1993): Automotive Vehicles - Instrument Systems - Pressure Gauges Electrical Type [TED 11: Automotive Electrical Equipment]

"ज्ञान से एक नये भारत का निर्माण"
Satyanarayan Gangaram Pitroda
"Invent a New India Using Knowledge"

Act Number 22 of 2005
The Indian Parliament
RIGHT TO INFORMATION

Made Available By
Public.Resource.Org

"ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है"
Bhartṛhari—Nītiśatakam
"Knowledge is such a treasure which cannot be stolen"

BLANK PAGE

BRUTUM FULMEN
IGNORANTIA JURIS NON EXCUSAT
PROTECTED BY COPYRIGHT

IS 13646 : 1993

(Reaffirmed 2003)

भारतीय मानक

स्वचल वाहन – उपकरण तंत्र – दाब गेज विद्युत प्रकार – विशिष्टि

Indian Standard

AUTOMOTIVE VEHICLES — INSTRUMENT SYSTEMS — PRESSURE GAUGES ELECTRICAL TYPE — SPECIFICATION

UDC 629·113·056·7 : 531·787·4

© BIS 1993

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

February 1993

Price Group 2

Automotive Instruments Sectional Committee, TED 10

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Automotive Instruments Sectional Committee had been approved by the Transport Engineering Division Council.

Electrical type pressure gauges are useful for indicating the pressure developed in an automotive engine system.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

AUTOMOTIVE VEHICLES — INSTRUMENT SYSTEMS — PRESSURE GAUGES ELECTRICAL TYPE — SPECIFICATION

1 SCOPE

This standard specifies the performance requirements of electrically operated air or oil pressure gauges for use with automotive engines.

2 REFERENCES

The following Indian Standards are necessary adjuncts to this standard.

IS No.	*Title*
1068 : 1985	Electroplated coatings of nickel plus chromium and copper plus nickel plus chromium on iron and steel (*second revision*)
1573 : 1986	Electroplated coatings of zinc on iron and steel (*second revision*)
2500 (Part 1) : 1973	Sampling inspection tables: Part 1 Inspection by attributes and by count of defects (*first revision*)
4827 : 1983	Electroplated coatings of nickel and chromium on copper and copper alloys (*first revision*)
9000 (Part 3/Sec 1) : 1977	Basic environmental testing procedures for electronic and electrical items: Part 3 Dry heat test, Section 1 General
9000 (Part 3/ Sec 2) : 1977	Part 3 Dry heat test, Section 2 Dry heat test for non-heat dissipating items with sudden change of temperature
9000 (Part 3/ Sec 3) : 1977	Part 3 Dry heat test, Section 3 Dry heat test for non-heat dissipating items with gradual change of temperature
9000 (Part 3/ Sec 4) : 1977	Part 3 Dry heat test, Section 4 Dry heat test for heat dissipating items with sudden change of temperature
9000 (Part 3/ Sec 5) : 1977	Part 3 Dry heat test, Section 5 Dry heat test for heat dissipating items with gradual change of temperature
9000 (Part 7/ Sec 2) : 1979	Part 7 Impact test, Section 2 Bump
9000 (Part 7/ Sec 3) : 1979	Part 7 Impact test, Section 3 Drop and topple
9000 (Part 12) : 1981	Part 12 Dust test
9000 (Part 16) : 1981	Part 16 Driving rain test
10250 : 1982	Severties for environment test for automotive electrical equipment
11086 : 1984	Speedometer and odometer systems for automotive application

3 GENERAL REQUIREMENTS

3.1 The construction of gauges shall be as shown in Fig. 1.

3.2 The gauge shall comprise of unitized sendor and receiver units. The sendor unit converts the pressure and the receiver unit indicates it.

3.3 The graduation shall be in kPa or Mpa. The gauges shall be plated or painted.

3.4 Sampling

Unless otherwise agreed upon, the sampling plan shall be in accordance with IS 2500 (Part 1) : 1973.

4 TESTS

4.1 The test conditions for gauges shall be as follows.

4.1.1 Pressure and humidity at the test place shall be kept constant as stipulated by standard conditions of test places. However in the specified error tests, the pressure shall be within ±3 percent of the full range.

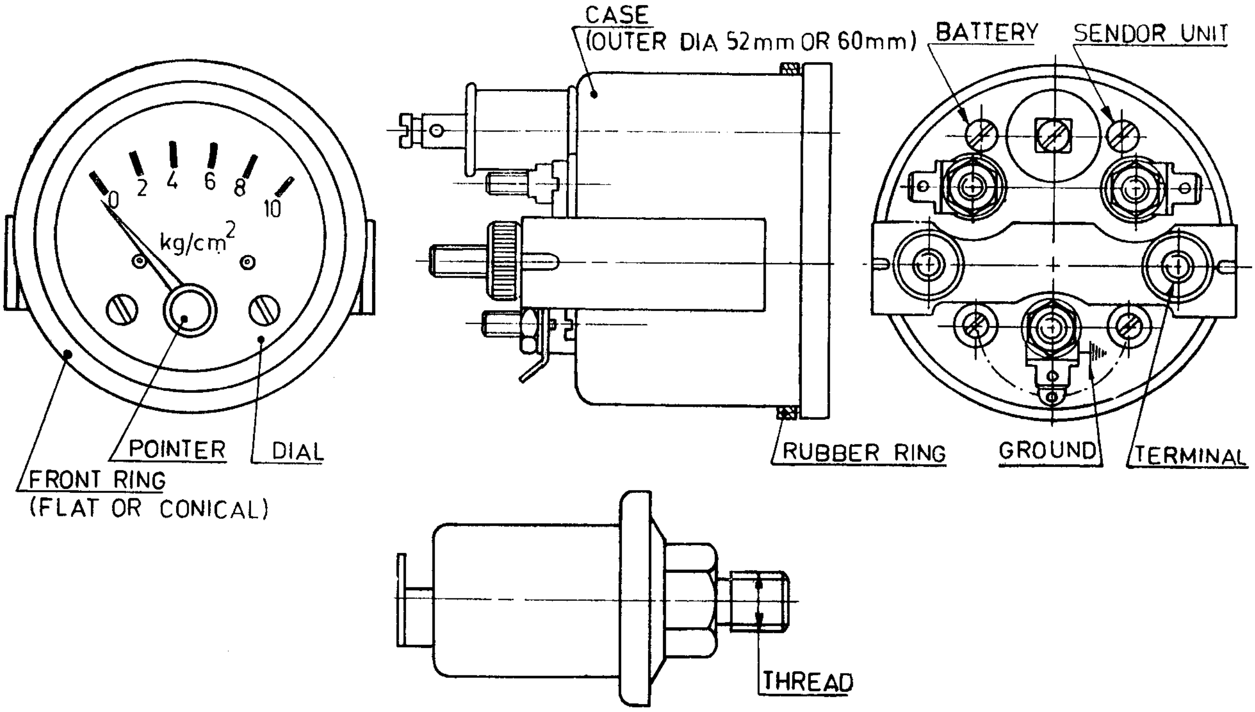
4.1.2 Mounting conditions shall be determined depending on the kind of vehicles.

4.1.3 Tolerances on indication shall be ±3 percent of the full range when the ambient temperature is varied from −25°C to 82°C (±8 percent when receiving unit connected with sending unit).

4.1.4 The response time of the gauge for sudden change of pressure from 10 kg/cm^2 to 0 kg/cm^2 shall be 1 second *Max.*

4.1.5 Hysterisis of indication upto ±2 percent shall be acceptable.

4.1.6 Test voltage of electrical pressure gauges shall be as shown in Table 1.



SENDOR UNIT

NOTES

1 Thread sizes M10 × 1, M14 × 1·5 and M18 × 1·5 are popular.

2 Threads with other sizes shall be agreed to between manufacturers and purchaser.

FIG. 1 AIR/OIL PRESSURE GAUGE — ELECTRICAL TYPE

Table 1 Test Voltages for Electrical Pressure Gauges
(*Clause* 4.1.6)

Nominal Voltage in Volts	Performance Test Voltage in Volts	Endurance Test Voltage in Volts
6	6·5	7 ± 0·5
12	13·5	14 ± 0·5
24	27·2	28 ± 1·0

4.2 Indication Error

The receiver unit shall be vibrated slightly or tapped to remove any functional resistance. The error shall be within ±3 percent of full range.

4.3 Insulation Resistance

At 500 V DC the insulation resistance between the terminal and main body shall be more than one mega ohm. The gauge shall withstand 500 V AC, 50 cycles per second between the insulated terminal and main bracket without arcing or puncturing.

4.4 Vibration Resistance

When the gauge and the receiver unit is mounted on a vibration tester to produce a simple harmonic motion, it shall vibrate through a frequency range of 10-55-10 Hz in one minute. With continuously varying frequencies the vibration shall be applied for not less than one hour in each of the three major axis as described in IS 11086 : 1984. When the sendor unit is vibrated in accordance with IS 11086 : 1984, it shall be operated at a pressure of about 80% of the highest graduation, the variation of the indication from that before the test shall be less than seven percent of the difference between the highest and the lowest graduation pressures. No abnormalities shall be observed in other parts. The receiver unit and sendor unit shall be tested separately.

4.5 Endurance Test

Pressure to the sendor unit of the gauge from the lowest graduation pressure to 80 percent of the highest graduation pressure shall be applied and then reduced to lowest graduation pressure. The process at the rate of 6 min/cycle for 3 000 times shall be repeated. At this time the variation from that before the test shall be less than seven percent of the difference between the highest and lowest graduation pressures. No abnormalities shall be observed in other parts.

4.6 Water Spray Test

When the gauge is exposed to direct water spray for 30 minutes and visually checked, no significant blur shall be observed on the glass inside of the receiver unit. If a lighting system or ventilation hole is provided, only the front glass shall be tested. The permissible variation between the observed value from the initial value shall be ±2 percent. Any ingress of water shall be checked as specified in IS 9000 (Part 16) : 1983.

4.7 Salt Spray Test

After carrying out the test given in Appendix A of IS 10250 : 1982 the test under normal condition shall be conducted with normal supply voltage range. The characteristics of the equipment and of necessary functioning of the equipment during the test shall also be checked. The permissible variation of the observed values from the initial values after the test shall be ±2 percent. The visual appearance of the gauge after the test shall not prejudice assessment of the results.

4.8 Dust Test

After carrying out the test specified in IS 9000 (Part 12) : 1981 the test under normal power supply voltage range shall be conducted and the characteristics of the equipment shall be recorded. The permissible variation of the observed values from the initial values after the test shall be ±2 percent.

4.9 Dry Heat Test

When tested at per IS 9000 (Part 3/Sec 1 to 5) : 1977 with a gradual change of temperature under the conditions, temperature 70 ± 3°C, duration of exposure : 4 hours, the permissible variation of the observed values from the initial values shall be ±2 percent.

4.10 Drop Test

After testing for drop test as per IS 9000 (Part 7/Sec 3) : 1979 the permissible variation of the observed values from the initial values after the test shall be ±2 percent.

4.11 Bump Test

After testing as per IS 9000 (Part 7/Sec 2) : 1979 the permissible variation of the observed values and the initial values shall not exceed ±2 percent.

4.12 Finishing (Painting)

Painted surface edges of the gauge and case shall be tested after conditions shown in Table 2 and free from peeling of paint, film softening, flooding and discoloration. The stipulation shall not apply to bases of resin.

4.13 Plating

Plating of surface edge of gauge and case shall be as shown in Table 3.

The total thickness of chromium plating on resin base shall be more than 10 µm.

4.14 Visual Test

When visually examined the gauge shall be free from any flaws or irregularties.

5 MARKING

Each gauge shall be marked with symbol of gauge, serial number indication of the source of manufacture, trade/brand name, date of manufacture printed preferably on the dial.

Table 2 Test Conditions for Testing Painted Films

(*Clause* 4.12)

Paint Film Not Exposed Directly to Wind of Rain			Painted Film Exposed Directly to Wind or Rain
Immersing solution	—	Water	Corrosion resistance shall be conducted as specified in **4.8** of IS 10250 : 1982.
Solution emperature	—	40°C	
Immersing time	—	1 h	
Time for evaluation	—	After immersion, leaving for 1 h in the room	

Table 3 Plating of Surface Edge and Case

(*Clause* 4.13)

Kind of Plating	Base	Thickness of Plated Surface Not Exposed Directly to Wind or Rain	Thickness of Plated Surface Exposed Directly to Wind or Rain	Applicable Standard
(1)	(2)	(3)	(4)	(5)
Nickel plating	Iron	Nickel plating 10 µm	—	General provisions for electroplating of automotive parts specified in IS 1068 : 1985 IS 1573 : 1986 IS 4827 : 1983
	Brass	Nickel plating 5 µm	—	
Chromium plating	Iron	Chromium plating 10 µm	Chromium plating 10 µm	
	Brass	Chromium plating 5 µm	Chromium plating 5 µm	
Galvanization	Iron	Zinc plating 5 µm	Zinc plating 8 µm	

Standard Mark

The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act, 1986* to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Director (Publications), BIS.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Handbook' and 'Standards Monthly Additions'. Comments on this Indian Standard may be sent to BIS giving the following reference :

Doc : No TED 10 (0010)

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones : 331 01 31, 331 13 75
Telegrams : Manaksanstha
(Common to all Offices)

Regional Offices: Telephone

Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg
NEW DELHI 110002
331 01 31
331 13 75

Eastern : 1/14 C. I. T. Scheme VII M, V. I. P. Road, Maniktola
CALCUTTA 700054
37 84 99, 37 85 61
37 86 26, 37 86 62

Northern : SCO 445-446, Sector 35-C, CHANDIGARH 160036
53 38 43, 53 16 40
53 23 84

Southern : C. I. T. Campus, IV Cross Road, MADRAS 600113
235 02 16, 235 04 42
235 15 19, 235 23 15

Western : Manakalaya, E9 MIDC, Marol, Andheri (East)
BOMBAY 400093
632 92 95, 632 78 58
632 78 91, 632 78 92

Branches : AHMADABAD. BANGALORE. BHOPAL. BHUBANESHWAR. COIMBATORE.
FARIDABAD. GHAZIABAD. GUWAHATI. HYDERABAD. JAIPUR. KANPUR.
LUCKNOW. PATNA. THIRUVANANTHAPURAM.

Printed at Printrade, New Delhi, India